REMARKS/ARGUMENTS

1. Rejection of claim 1 under 35 U.S.C. 112:

Claim 1 recites the limitation "the first assist feature" in line 9. There is insufficient antecedent basis for this limitation in the claim.

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Response:

The above-identified Office Action is a second Office Action of this application. However, claim 1 was not rejected under 35 U.S.C. 112 in the first Office Action, but is rejected in this Office Action. The original claim 1 is listed as below:

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Claim 1:"An optical proximity correction (OPC) method for correcting a photomask layout, wherein the photomask layout comprises at least a photomask pattern, the OPC method comprising:

collecting an assist feature bias of a predetermined first assist feature which will be
15 added to the photomask layout;

performing a rule-based OPC process by taking account of the assist feature bias to compute a target bias of the photomask layout and output a corrected photomask layout according to the target bias; and

adding the first assist feature to the corrected photomask layout."

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Accordingly, the limitations in line 4 of claim 1 have described the term "a predetermined **first assist feature**" and which is the antecedent basis for the term "the first assist feature" in line 9, wherein the word "predetermined" is only an adjective of the "first assist feature". Therefore, applicants believe claim 1 should be acceptable under 35
25 U.S.C. 112. However, in order to avoid a misunderstanding with considering the term "the fist assist feature" in line 9 as a different matter from the "first assist feature" in line 1, claim 1, as well as claim 2, has been amended to add the term "predetermined" in line

9 for describing "the first assist feature". These amendments are shown in the "Listing of Claims" section. No new mater is introduced. Acceptance of the amendments is politely requested.

5   **2. Rejections of claims 1-7:**

Claims 1-7 are rejected under 35 U.S.C. 102(e) as being unpatentable by Liebmann et al. (US Patent 7,001,693), as cited in pages 2-4 of the above-identified Office action.

Response:

10   According to claim 1, the main characteristics of this application comprise: (a) *collecting an assist feature bias of a predetermined assist feature which will be added to the photomask layout*; (b) performing a rule-based OPC process by taking account of the assist feature bias to compute a target bias of the photomask layout; (c) outputting a corrected photomask layout according to the target bias; and (d) *adding the* 15 *predetermined assist feature to the corrected photomask layout to complete the design of the photomask layout.* Therefore, the assist feature (such as scattering bars) added last is not corrected by the rule-based OPC process such that the spacing between the assist feature and the photomask pattern can be effectively controlled during the whole correction process. As a result, the limitation of adding the assist feature, such as 20 scattering bars, of the prior art, or the situations of exposing the assist feature on a semiconductor substrate can be avoided. Furthermore, *the parameters of scattering bars are taken into account and input into the rule-based OPC software in the beginning of the process. In this way, the scattering bars last added to the photomask layout bring a preferable exposing effect, especially improving the process window of the isolation* 25 *region* (para. [0036]).

Referring to the application of Liebmann et al, Fig. 4 shows a conventional rule-based OPC method, which includes:

Step 100: Start;

Step 102: Develop a circuit layout with main pattern features;

Step 104: Apply correction bias of the circuit layout according to sub-resolution assist feature (SRAF) rules for replacing SRAF elements and spacing the main pattern features (col.12, lines 59-62), wherein the SRAF rules are stored in table 106;

Step 108: Apply SRAF elements to the circuit layout according to SRAF rules (table 106;

Step 110: Legalize or clean up SRAF elements by optimizing the circuit layout with the SRAF elements as a function of style elements and manufacturability constraints, as shown in Figs. 2-3 (col.13, lines 1-6);

Step 118: Output the corrected circuit layout; and

Step 120: End.

Accordingly, Fig. 4 of Liebmann's only teaches a prior-art conventional rule-based OPC method, wherein the step 104 never discloses the characteristic (a) "collecting bias of a predetermined first assist feature before an OPC process" and the characteristic (b) "executing a rule-based OPC by considering the bias of the first assist feature at the same time" of this application.

In addition, Fig. 8 of Liebmann's discloses a binary-OPC method, whose spirit is to modify the rule-based OPC process of Fig. 4 or model-based process of Fig. 5 for re-checking the OPC-corrected circuit layout by determining which edges of which pattern features and which SRAF elements of the current design are risk of being spaced too far apart and therefore requiring performance of the proximity correction function of Liebmann's invention (Step 112, and col. 16, lines 47-53), and then to locate critical feature edges that are lacking SRAF elements and compensate for the SRAF elements-loss by providing a bias by expanding the width of a localized feature (Step 114, and col. 16, lines 58-61). To sum up, *the main method disclosed by Liebmann et al. is to*

perform a second OPC correction after a first rule-based or model-based OPC for determining if there are local patterns lacking SRAF elements resulting from the "legalizing step" (Step 110 in Fig. 4 or Fig. 5) and locally correcting the problem patterns by adding correction bias.

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As a result, the application of Liebmann et al. and this application have at least the below listed differences: (1) *Liebmann et al. never teach collecting an assist feature bias of an assist feature predetermined to add in the layout before executing the rule-based OPC nor teach performing the rule-based OPC by taking account the collected assist*

10   *feature bias simultaneously;* and (2) *this application method comprises the step of directly adding the first assist feature into the outputted corrected photomask layout, while Liebmann et al. teach performing another OPC to check where has problem patterns in the layout for locally correcting.* Therefore, the spirits, steps and purposes of Liebmann's and this application claimed in claim 1 are quite different. Applicants believe claim 1 of

15   this application should be patentable in regard to 35 U.S.C. 102(e). Reconsideration of claim 1 is politely requested.

Claim 2 describes the predetermined first assist feature is a scattering bar. However, Liebmann et al. never teach collecting bias of a first assist feature before performing an

20   OPC process, thus the limitation in claim 2 is certainly not disclosed by Liebmann et al. Accordingly, Liebmann et al. does not teach the limitation of claim 3 of building an assist feature correction model by taking account of the collected assist feature bias which is collected before the OPC process nor teach the limitation of claim 4 of transferring the collected assist feature bias to a specific format for the rule-based OPC process. As a

25   result, claims 2-4 should be patentable in contrast to Liebmann et al. In addition, since claims 2-7 are all dependent upon claim 1, claims 2-7 should be allowable if claim 1 is allowable. Reconsideration of claims 2-7 is hereby requested.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,

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15 is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)